

FORM PTO-1390 (REV. 9-2001)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER J-1950
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. (If known, see 37 CFR 1.5) <b>10/030604</b>
INTERNATIONAL APPLICATION NO. PCT/JP99/03942	INTERNATIONAL FILING DATE 22 July 1999 (22.07.99)	PRIORITY DATE CLAIMED 22 July 1999 (22.07.99)	
TITLE OF INVENTION AQUEOUS FLOOR POLISHING COMPOSITION			
APPLICANT(S) FOR DO/EO/US KONDO, Tetsuro, et al.			

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

- ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
- ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
- ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
- ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
- ☐ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - ☐ is attached hereto (required only if not communicated by the International Bureau).
  - ☐ has been communicated by the International Bureau.
  - ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
- ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - ☒ is attached hereto.
  - ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
- ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - ☐ are attached hereto (required only if not communicated by the International Bureau).
  - ☐ have been communicated by the International Bureau.
  - ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - ☐ have not been made and will not be made.
- ☒ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
- ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
- ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11 to 20 below concern document(s) or information included:**

- ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
- ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
- ☐ A **FIRST** preliminary amendment.
- ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
- ☐ A substitute specification.
- ☒ A change of power of attorney and/or address letter.
- ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
- ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
- ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
- ☒ Other items or information:  
See Attachment 1

531 Rec'd POT/ET 09 JAN 2002

US APPLICATION NO (if known, see 37 CFR 1.51)

INTERNATIONAL APPLICATION NO

ATTORNEY'S DOCKET NUMBER

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J-1950

21. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):**

Neither international preliminary examination fee (37 CFR 1.482)  
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO  
and International Search Report not prepared by the EPO or JPO. . . . . \$1040.00

International preliminary examination fee (37 CFR 1.482) not paid to  
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CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	2 - 20 =	0	x \$18.00	\$ 0.00
Independent claims	2 - 3 =	0	x \$84.00	\$ 0.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00	\$ 0.00

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☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above  
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Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be  
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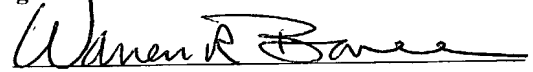
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**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR  
1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

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REGISTRATION NUMBER

## DESCRIPTION

## Aqueous Floor Polishing Composition

## Technical Field

The present invention relates to an aqueous floor  
5 polishing composition excellent in gloss restorability.  
In particular, the present invention relates to an  
aqueous floor polishing composition which is desirable  
for the application to floor surface of wooden floor  
material, floor material comprised of synthetic resin,  
10 or stone floor made of concrete or marble, especially,  
for dry maintenance which is carried out as daily  
maintenance by using a combination of cleaning with an  
automatic floor cleaning machine and buffing with a  
high-speed polisher.

## 15 Background Art

Floor polishing agents have been used for the  
floor surface of wooden floor material, chemical floor  
material made of synthetic resin, or stone floor  
material comprised of concrete or marble for the  
20 purpose of keeping the beauties of the floor material  
and protecting the floor surface. The floor polishing  
agents generally include oil-type agents using  
solvents, aqueous agents, emulsion-type agents and the  
like. For example, Japanese Patent Publication Nos. Sho  
25 47-14019 and Sho 47-15597 disclose floor polishing  
compositions which use a polyvalent metal compound in a  
polymer of an ethylenically unsaturated compound. The

coating film obtained by applying and drying this floor polishing composition is excellent in durability or travelling, and nowadays, this type of floor polishing composition is dominantly used.

5           A floor polishing agent containing an aqueous emulsion of polyurethane resin has been developed for the purpose of improving anti-slip properties. See, e.g., Japanese Patent Publication No. Sho 53-22548. In addition, Japanese Patent Application laid-Open No. Sho  
10   61-148273 discloses that in order to improve heel-mark resistance or scuff resistance, the film durability can be enhanced by using a mixture of an aqueous resin with colloidal silica and butoxyethyl phosphate in combination. Furthermore, Japanese Patent Application  
15   Laid-Open No. Sho 8-41382 discloses a method for improving film durability. However, in the aforementioned prior art, there is no disclosure of significantly improving gloss restorability by buffing, and hence, the development of new technique has been  
20   desired in this field.

          The buffing operations in dry maintenance are carried out for restoring the floor surface by plastically deforming or cut-removing small damages on the coating surface caused by walking, etc. and  
25   restoring gloss lowered by walking, etc.

          In general, the improvement in the gloss restorability by buffing with floor polish may be

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achieved by adjusting a composition of resin in an acryl-styrene type emulsion which is a main component of a polishing agent, but heel-mark resistance, scuff resistance, etc. are deteriorated. Accordingly, it has  
5 been very hard to obtain a floor polishing composition which is excellent in gloss restorability by buffing, and besides, excellent in heel mark resistance and scuff resistance.

#### Disclosure of Invention

10 The present invention is to provide a novel, aqueous floor polishing composition capable of forming a coat showing excellent gloss restoration by buffing while retaining general properties such as durability required for floor polishing agents.

15 The inventors found out, as a result of eager investigation and study, that the use of a butadiene type copolymer component in an aqueous floor polishing resin composition will readily afford the evenness of a coat after buffing by means of a high-speed polisher,  
20 thereby improving the gloss restoration by buffing. Thus, according to the present invention, there is provided an aqueous floor polishing composition characterized by containing 5 to 100 parts as solid of a styrene-butadiene type copolymer emulsion based on  
25 100 parts as solid of an acryl-styrene type resin emulsion.

The styrene-butadiene type copolymer emulsion

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which can be used for the present invention is preferably that obtained by copolymerization of styrene and butadiene. Any type of thus obtained copolymer may be used regardless of molecular weight, molecular  
5 structure and preparation method. For the copolymerization of styrene and butadiene aromatic and/or aliphatic monomers such as methyl methacrylate and the like may be incorporated at an arbitrary copolymerization ratio. Copolymerization with  
10 unsaturated fatty acid such as acrylic acid and methacrylic acid or dispersion into water using emulsifiers may be conducted for water dispersibility or water solubility. Such butadiene type copolymer latex, including copolymers obtained by emulsion  
15 copolymerization of butadiene and a variety of monomers, is widely used for compositions for paper coating or the like. A typical example of such latex is described in Japanese Patent Publication No. 54-6575. The water base floor polishing agent of the  
20 present invention can be prepared by adding such butadiene type copolymer latex into acryl-styrene type resin emulsions. It can be also prepared by polymerizing monomers containing butadiene in the presence of acryl-styrene type copolymerization  
25 components or polymerizing monomers such as aliphatic unsaturated compounds and styrene in the presence of butadiene type copolymerization components. Concerning

the ratio of acryl-styrene type resin to styrene-butadiene type copolymer emulsion, the styrene-butadiene type copolymer emulsion is in the range of 5 to 100 parts, preferably in the range of 5 to 50 parts, with respect to 100 parts of acryl-styrene type resin. The butadiene in the styrene-butadiene type copolymer emulsion is preferably in the range of 25 to 70 % by weight, and the styrene in the styrene-butadiene type copolymer emulsion is preferably in the range of 0 to 75 % by weight, and more preferably in the range of 30 to 75 % by weight.

An example of the acryl-styrene type resin emulsion which can be preferably used in the present invention is the resin composition disclosed in Japanese Patent Publication No. 44-24409 or the like. The composition comprises a copolymer of alpha, beta-ethylenic unsaturated carbonic acids and ester derivatives thereof, especially acrylic acid or methacrylic acid and ester derivatives thereof, and aromatic monomers such as styrene. Specifically an ethylenic unsaturated compound is selected from the group consisting of styrene, methylstyrene, acrylic acid, methyl acrylate, ethyl acrylate, propyl acrylate, butyl acrylate, hexyl acrylate, 2-ethylhexyl acrylate, lauryl acrylate, methacrylic acid, methyl methacrylate, ethyl methacrylate, propyl methacrylate, butyl methacrylate, hexyl methacrylate, 2-ethylhexyl

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methacrylate, vinyl acetate, acrylonitrile, itaconic acid, maleic acid and the like, thereby obtaining the polymer emulsion by a known emulsion polymerization method.

5           In the present invention, for the purpose of satisfying various characteristics required for the floor polishing agent, various additives can be contained in the aqueous floor polishing composition. Among the characteristics, an appropriate sliding  
10   property can be obtained and its black heel mark resistance and durability are made excellent by adding a wax to the composition. As the wax, it is possible to use an aqueous solution of a natural wax or a synthetic wax dispersed therein which is generally used  
15   for floor polishing. Specifically, the natural wax includes carnauba wax, paraffin wax and the like. The synthetic wax includes polyethylene, polypropylene and oxides thereof as well as waxes obtained by polymerizing unsaturated monomers such as ethylene, propylene and  
20   the like or monomers selected from the group consisting of  $\alpha$ - or  $\beta$ -ethylenically unsaturated carboxylic acid, alkyl esters thereof and the like. Though the wax content in the aqueous floor polishing composition of the present invention is optionally determined, 0 to 20  
25   % by weight is preferable.

A crosslinking agent is added to the aqueous floor polishing composition of the present invention to





peelability and glossiness. As the alkali-soluble resin, there can be included styrene-maleic acid copolymer resin, rosin-maleic acid copolymer resin, water-soluble acrylic resin, water-soluble polyester resin, water-soluble epoxy resin, or the like. The content of the alkali-soluble resin in the aqueous floor polish composition of the present invention can arbitrarily be determined.

In the aqueous floor polishing composition of the invention, by incorporating an aqueous polyurethane type resin, it is possible to improve the durability. As the aqueous polyurethane type resin, there can preferably be used one containing a carboxylic acid and/or carboxylate bonded to a chain of a polyurethane type resin. Such a resin can be obtained by, for example, when producing a polyurethane type resin, adding diol or the like having a carboxylic acid group to diol and di-isocyanate, neutralizing the carboxylic acid group as needed, and effecting polymerization. The introduction of a carboxylic acid group affords an aqueous polyurethane type resin having water-dispersibility or water-solubility. Further, adding an emulsifying agent can make the resin aqueous as needed.

The aqueous floor polishing composition of the invention may contain an plasticizer or film-forming assistant. As the plasticizer, there are included dibutyl phthalate, dioctyl phthalate, 2-pyrrolidone,

octyl diphenyl phosphate, tributoxyethyl phosphate, and the like. As the film-forming assistant, there are preferably used alkylene glycol monoalkyl ether, dialkylene glycol monoalkyl ether, trialkylene glycol monoalkyl ether, and there are specifically included  
5 diethylene glycol monobutyl ether, diethylene glycol monoethyl ether, dipropylene glycol monomethyl ether, and the like.

The aqueous floor polishing composition of the  
10 invention may contain silica sol. Further, the composition may contain a fluorine type surfactant or a preservative.

The present invention will be described below in great detail by giving Examples and Comparative Example  
15 which will illustrate the technical effects of the present composition.

#### EXAMPLE 1

Ten (10) parts of a styrene-butadiene type copolymer latex composed chiefly of styrene/butadiene =  
20 60/40, having Tg of  $-1^{\circ}\text{C}$  was added to 100 parts of an acryl-styrene type resin emulsion composed of butyl acrylate/methyl methacrylate/ styrene/methacrylic acid = 32/28/20/20, having Tg of  $46^{\circ}\text{C}$  and an acid value of 130 to prepare an aqueous floor polishing composition 1  
25 of the present invention.

#### EXAMPLE 2

An aqueous floor polishing composition 2 of the

present invention was prepared in the same manner as in Example 1 except that the amount of the styrene-butadiene type copolymer latex was changed to 20 parts.

#### EXAMPLE 3

5        An aqueous floor polishing composition 3 of the present invention was prepared in the same manner as in Example 1 except that the amount of the styrene-butadiene type copolymer latex was changed to 30 parts.

#### COMPARATIVE EXAMPLE

10        Only the acryl-styrene type resin emulsion used in Example 1 was used and made an aqueous floor polishing composition 4.

      The aqueous floor polishing composition obtained in Example 2 was dried at 60°C for 12 hours to prepare  
15        a sample for analysis, which was then analyzed as to the butadiene contained in the composition by using an infrared spectrophotometer (KBr tablet method; integration for 100 times using 60SX Fourier transform infrared spectrophotometer manufactured by Nicolet).

20        As a result, absorption peaks were observed in the wavelength regions of 960 to 970  $\text{cm}^{-1}$  (trans 1,4 CH bending vibration), 900 to 920  $\text{cm}^{-1}$  (R-CH=CH bending vibration) and 1640  $\text{cm}^{-1}$  (C=C stretching vibration) which are the characteristic absorption bands of  
25        butadiene copolymer. Further, as a result of another analysis which was carried out by using a thermal decomposition gas chromatograph (HP5890A gas

chromatograph manufactured by Hewlett Packard Co.,  
Ltd.; FID detection; high frequency furnace type  
thermally decomposing apparatus manufactured by Nippon  
Bunseki Kogyo K.K.; thermal decomposition at 590°C for  
5 5 sec.), the butadiene monomer decomposed was  
confirmed, so that it was confirmed that butadiene was  
contained as the monomer component in the aqueous floor  
polishing composition of the present invention.

The aqueous floor polish compositions 1 - 4  
10 prepared in Examples 1-3 and Comparative Example 1 were  
used to prepare floor polishing agents. To 100 parts  
by solid weight of the composition, 10 parts of  
tributoxyethyl phosphate (a plasticizer), 25 parts of  
diethylene glycol monoethyl ether (a filming aid), 0.05  
15 parts of fluorine-based detergent Zonyl FSJ (25%  
solid)(a product of Du pont), 6.37 parts of ammonium  
carbonate zinc aqueous solution (12% solid), 6.25 parts  
of styrene maleic acid resin SMA-2625A (15% solid)(a  
product of ATOCHEM), 18.76 parts of polyethylene wax  
20 emulsion Hytec E-4B (40% solid) (a product of Toho  
Kagaku Inc.), and 0.68 parts of Deltop (a preservative,  
a product of Takeda Chemical Industries) are added  
successively.

With each aqueous floor polishing agent thus  
25 obtained, gloss restoration by buffing was determined.  
The results are shown in Table 1. The determination  
method is as follows:

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1. Glossiness: determined according to JIS K-3920 (Test method for floor polish);

2. Gloss restoration by buffing: Onto a homogeneous vinyl floor tile (a product of TORI Inc., product name: MATICO S PLAIN No.5626), the sample polishing agent was applied five times, and then the glossiness was measured (a). After that, the gloss was removed by using an automatic floor washing machine J-CRUISE ( a product of Johnson Professional Inc.)(b)), then the tile was buffed twice by using Ultra high speed polisher SPRINT-2000BP(a product of Johnson Professional Inc.) with a green pad (c and d), to determine the gloss restoration by buffing from the glossiness difference before and after buffing.

15



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restorability in buffing and high durability that have  
been long desired as properties for floor polishing  
agents. The aqueous floor polishing composition of the  
invention is particularly suitable for 'dry  
5 maintenance' that is a daily maintenance work comprised  
of washing by means of an automatic washer and buffing  
by means of a high-speed polisher.



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## CLAIMS

1. An aqueous floor polishing composition comprising 5 to 100 parts by weight of a solid styrene-butadiene type copolymer emulsion based on 100 parts solids of an acrylic-styrene type resin emulsion.

2. A method of imparting gloss to a flooring surface and maintaining said gloss comprising:

a) applying to a floor an aqueous floor polishing composition containing 5 to 100 parts by weight of a solid styrene-butadiene type copolymer emulsion based on 100 parts solids of an acrylic-styrene type resin emulsion;

b) allowing said composition to dry to form a glossy film on said floor; and

c) periodically washing said film with water and thereafter buffing said film with a high-speed polisher to restore said gloss.

ABSTRACT

An aqueous floor polishing composition contains 5  
to 100 parts as solid of a styrene-butadiene type  
copolymer emulsion based on 100 parts as solid of an  
5 acryl-styrene type resin emulsion. The novel aqueous  
floor polishing composition forms a coat excellent in  
gloss restoration by buffing.

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- With international search report.
- With amended claims and statement.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: AQUEOUS FLOOR POLISHING COMPOSITION

(57) Abstract: An aqueous floor polishing composition contains 5 to 100 parts as solid of a styrene-butadiene type copolymer emulsion based on 100 parts as solid of an acryl-styrene type resin emulsion. The novel aqueous floor polishing composition forms a coat excellent in gloss restoration by buffing.

WO 01/07529 A1

COMBINED DECLARATION AND POWER OF  
ATTORNEY FOR PATENT APPLICATION

As below named inventors, I hereby declare that:

This patent application is based on PCT International Application No.  
PCT/JP99/003942; assigned U.S. Application No. 10/030,604.

Our residence, post office address and citizenship are as stated below next to our  
names:

We believe we are the original, first and joint inventors of the subject matter which is  
claimed and for which a patent is sought in the invention entitled: AQUEOUS FLOOR  
POLISHING COMPOSITION, filed with the United States Receiving Office on 09 January  
2002.

We hereby state that we have reviewed and understand the contents of the above  
identified specification, including the claims.

We acknowledge the duty to disclose information which is material to the  
examination of this application in accordance with Title 37, Code of Federal Regulations,  
§1.56(a).

We hereby appoint Warren R. Bovee (Reg. No. 26,434), Neil E. Hamilton (Reg. No.  
19,869) and Renee J. Rymarz (Reg. No. 35,666) as our attorneys to prosecute this application  
and to transact all business in the Patent and Trademark Office connected herewith. 3

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We hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

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